COLORADO RIVER RECOVERY PROGRAM Project No.: C-18/19
FY-2002 & 2003 PROPOSED SCOPE OF WORK for: And PIP-10
Removal and Control of Nonnative Fishes in Source Ponds

Lead Agency: Colorado Division of Wildlife
Submitted by:

Project Leader: West Region Senior Biologist (currently Sherman Hebein acting)

Principal Investigators:

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Public Involvement: Vacant

Note: Public involvement activities that are underlined will not be accomplished, and the budget will be adjusted, unless a public involvement replacement individual is identified.

Date: Revised September 20, 2001

Category:
X Ongoing Project
___ Ongoing-revised project
___ Requested new project
___ Unsolicited proposal

Expected Funding Source:
___ Annual funds
X Capital funds
___ Other (explain)

I. Title of Proposal: Removal and control of nonnative fishes in Colorado and Gunnison River floodplain source ponds.

II. Relationship to RIPRAP:

This proposal addresses the chronic escapement of nonnative fish from floodplain ponds. Nonnative fish known to occur in these ponds, including largemouth bass and black crappie, typically seek backwater or slow moving side channel habitats upon entering the main stem river. It is in these riverine habitats that these centrarchids are believed to pose a significant predatory threat to the young life stages of endangered and other native fishes (Tyus and Saunders 1996). Overall, this strategy is intended to greatly reduce the number of chronic sources of centrarchid and other nonnative fish species accessing riverine habitats, thereby contributing to the recovery of endangered fishes.

General Recovery Program Support Action Plan:

III Reduce negative impacts of nonnative fishes and sport fish management activities.
III.A.2. Identify and implement viable control measures.
III.A.2.c. Implement and evaluate the effectiveness of viable active control measures.
III.B. Reduce negative impacts to endangered fish from sport fish management activities.
III.C. Ensure public involvement occurs as appropriate.

Colorado River Action Plan: Mainstem

III Reduce negative impacts of nonnative fishes and sport fish management activities.
III.A. Reduce negative impacts to endangered fish from sport fish management activities.
III.A.3 Reclaim ponds in critical habitat.
III.B. Ensure public involvement occurs as appropriate.

III. Study Background/Rationale and Hypotheses:

Floodplain corridors bordering the main-stem rivers in the Upper Colorado River Basin are considered an integral and necessary element in the recovery of the four endangered big river fish species. Lentic habitats comprised of backwaters, embayments created by flooded terraces, and ponds created in depressions all have been identified as a critical habitat component in the life histories of the listed species, and generally important to the native fish community and ecological functions supporting the endangered fishes (Irving and Burdick 1995). Nonnative fish species are present throughout the Upper Basin, and can present adverse impacts to recovery progress for the endangered fishes through predation or competition at critical life stages or in critical locales. These concerns come into focus with the negative interactions between certain nonnative fish species and young life stages of the endangered fishes in floodplain nursery habitats.

Control of nonnative fishes to minimize negative impacts to endangered fishes will be implemented under two categories: (1) reduction of nonnative fish abundance in riverine habitat and (2) reduction of escapement from waters serving as sources of nonnative fishes determined to be problematic to critical habitat reaches. Floodplain ponds along the Colorado and Gunnison rivers represents a chronic source of nonnative fish species having documented or presumed negative impacts on the early life stages of Colorado pikeminnow and razorback sucker. This escapement would have a counterproductive influence on the success of both habitat restoration for endangered and native fishes and removal efforts for nonnative fish in the mainstem rivers within critical habitat. Reclamation strategies for ponds may include 1) removal of existing nonnative fish species using piscicides and/or draining by pumping, 2) annual cyclic water management resulting in periodic pond drying 3) prevention of winter survival and reproduction of nonnative fish species by decreasing pond depth 4) installation of escapement prevention

devices as appropriate to the target water and its future management objectives 5) installation of drainage pipes to re-route irrigation water, known to contain larval nonnative fish, away from ponds and 6) installation of inlet screens to prevent reinvasion of reclaimed ponds. Future pond reclamations may be coordinated with native and/or endangered fish conservation, wetlands development, or enhancement of sport fishery goals within the constraints of the Nonnative Fish Stocking Procedures (CDOW et al. 1996). Reclaimed waters developed for sport fishery purposes would be monitored for re-occurrence of unwanted nonnative fish species. The scope of this proposed control project involves determining if ponds are problematic sources of nonnative fish, chemically reclaiming problematic source ponds, managing water depths, reshaping pond bathymetry, and/or isolating floodplain ponds and the evaluation of effectiveness of control efforts in the ponds.

IV. Study Goals, Objectives, End Product:

Goal: To reduce proliferation of nonnative fish species in floodplain habitats and minimize chronic escapement of nonnative fishes from perennial ponds.

While the goal of this proposal remains the same, the following events in 1996-2001 involved with implementing this strategy influenced the course of this project. 1) Pond pumping proved successful, but comparatively expensive. Chemical reclamation of ponds with rotenone may require long-term applications during winter due to cold water temperatures (Spitler 1986). Pond pumping remains an option during the winter months within the project area. 2) The use of chlorine as a piscicide for effecting a 100% fish kill in recently pumped gravel pits, during winter, was implemented and evaluated by CDOW biologists and was deemed successful. However, in February 1998, a similar reclamation project, in two neighboring 20 year old gravel pits, resulted in an incomplete fish kill due to excessive deposition and suspension of organic material, a myriad of fresh water seeps, and rapid breakdown of chlorine by sunlight. 3) Irrigation water is known to contain larval nonnative fish. Therefore, options other than chemical reclamation, will be used to control the movement of nonnative fish in ponds that receive irrigation water on an annual basis. 4) Potential adverse effects of floodplain pond reclamation on birds in general and fish-eating birds in particular was raised with the Colorado Wildlife Commission and represents an issue that may require future mitigation. A native (non-listed) fish refugium was established Oct 1999 from fish salvaged from the Government Highline Canal following draining. These fish may serve as a source of native fish for mitigation efforts. Similarly, approximately 12,000 native fish (including one razorback sucker) were salvaged from this canal 11/17/00. Future salvage efforts may allow stocking of native fish in reclaimed ponds. 5) The training and certification of six permanent employees for pesticide transport, storage, and application is completed. Two newly hired permanent employees require Qualified Supervisor certification from the Department of Agriculture to apply pesticides. One of these employees will monitor private sector stocking permits to ensure compliance with the Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin (CDOW et al. 1996). Seasonal personnel must be certified for pesticide application each year. 6) All data including landowner and potentially affected interests, pond information, fish data, and

nonnative fish control costs are being entered into Microsoft Access as they become available. 7) A private pond-owner incentive package for gaining access to privately held ponds and for encouraging voluntary participation in nonnative fish control efforts was drafted Nov 1997 and is being successfully implemented. The degree to which this package can be implemented depends on annual budget allocations. 8) The first contract for development and installation of screens was implemented Apr 2000. This contract involved three parties including the landowner, contractor, and CDOW. Due to the complexity of these contracts, our first contract required several consultations with CDOW's and State of Colorado's legal advisors, and numerous negotiations with both the landowner and contractor, and repeated trips to each to obtain signatures. 9) Careful coordination between Pond Reclamation, Colorado State Parks, Wetlands Initiative, Flooded Bottom Land, and other conservation projects is necessary to facilitate access to ponds without jeopardizing ongoing/future monetary negotiations or confusing pond-owners about activities associated with the Recovery Program. In an effort to alleviate landowner confusion and misconceptions an informative consent building tool (Listening Log) has been implemented at the recommendation of Hans Bleiker (Institute for Participatory Management and Planning, 1997). Public involvement efforts will inform and gain public input into the process as appropriate.

An Environmental Assessment was developed by USFWS with assistance by CDOW and a Finding of No Significant Impact was issued 2/4/98 (USFWS 1998a,b) after a Biological Opinion on the EA was issued 1/27/98 (USFWS 1998c). The Biological Opinion contains guidelines and constraints which will add additional cost, time and possibly delays before nonnative fish control projects can be initiated and completed. Notable constraints include:

1) Pre-control fish surveys will be conducted to determine the presence or absence of federally listed fish species.
2) Incidental take shall not exceed 10 Colorado pikeminnow, 10 razorback sucker, 10 humpback chub, and 2 bonytail chub. If the permitted incidental take level is met formal section 7 consultation should be reinitiated.
3) CDOW will identify suitable shoreline vegetation for southwestern willow flycatcher nesting concurrently with preliminary determination of fish species structure, pond volume, and water chemistry. If potential southwestern willow flycatcher habitat is present either reclamation will be postponed until after the breeding season (May 1 to August 15) or three independent surveys will be conducted. If flycatchers occupy a control site, reclamation will not be permitted until after August 15.

Objectives:

1. To assess ponds as problematic/non-problematic through inventory and sampling efforts.

2. To conduct reclamation/water management/pond reshaping/isolation of at least ten ponds in FY01/02.

3. To reclaim/control water levels/reshape/isolate up to 150 floodplain ponds of the Colorado and Gunnison rivers through 2003.

4. To minimize reinvasion of ponds, escapement of fishes from treated ponds and escapement of fishes from ponds outside the treatment area by screening or other anti-escapement device/strategy.

5. To monitor potential reinvasion of nonnative fish species in floodplain ponds and escapement of nonnative species from ponds managed as sport fisheries.

6. To determine if nonnative fish control in floodplain ponds on a river-reach scale contributes significantly to reductions in the abundance of nonnative fishes in existing riverine nursery habitats.

7. To identify public concerns and values and provide a mechanism to incorporate public perspectives and issues into the process of reclaiming ponds.

8. To inform interested communities about the reasons we are conducting pond reclamation in support of efforts to recover the endangered fishes.

9. <u>To build public support for pond reclamation and to provide information to, and collect input from, the public, news media, special interest groups, government and Congressional officials in a timely manner.</u>

End Product:

1. Identification of ponds chronically contributing nonnative fish to critical habitat.

2. Reduction in the number of floodplain ponds serving as sources of nonnative fishes into native fishes riverine habitat.

3. Demonstrated compatibility of endangered fish recovery, native fish conservation, and sport fish recreational uses.

4. Biannual "Listening Log" (Institute for Participatory Management and Planning, 1997) prepared and distributed.

5. <u>News releases and television spots to highlight work being done and progress being made.</u>

6. <u>Article in Colorado Outdoors Magazine and Recovery Program newsletter focusing on pond reclamation efforts.</u>

V. Study Area:

Colorado River: Rifle to state line, 50 yr floodplain and outlying ponds.

Gunnison River: Austin to Colorado River confluence, 50 yr floodplain and outlying ponds.

VI. Study Methods/Approach:

A. Pond reclamation planning

This proposal targets reclamation/isolation of ponds within the 50 yr floodplain and isolation of ponds outside of the 50 year floodplain (see Attachment). However, an adaptive approach to prioritizing individual ponds for reclamation/isolation will be followed. Examination of 246 ponds in available floodplain aerial photos taken in 1993 along the Colorado River from Palisade to Loma showed 55% (136 ponds = 514 surface acres) of the ponds in the 10 yr floodplain and 22% (55 ponds = 149 surface acres) of the ponds in the 10-50 yr floodplain. Of the 191 ponds within the 50 year floodplain between Palisade and Loma, 156 are privately owned. Of these, 53% (83) are less than one acre in size, 42% (65) are 1-10 acres in size and 5% are over 10 surface acres with only one pond exceeding 20 surface acres. Aerial photos from the Gunnison River in 1994 showed 17 ponds from Delta to the Colorado River of which 12% (2 ponds = 3 surface acres) lie within the 10 yr floodplain and 35% (6 ponds = 3 surface acres) were in the 10-50 yr floodplain. Note that the preceding figures include the entire count of ponds identified in the Mitchell (1996) pond survey. However, because aerial photos were not available for the entire river lengths encompassed by critical habitat and the dynamic movement of the rivers result in the creation and destruction of ponds, the number of floodplain ponds far exceeds the previous estimation of 246. As new information becomes available ownership status and floodplain position of targeted ponds will be updated in Microsoft Access.

Several strategies are available for removing and/or containing existing fish populations in floodplain ponds. The application of these techniques either singly or in various combinations will depend on case-by-case considerations of pond characteristics, treatment cost and intended pond use following evaluation/reclamation.

1. Rotenone: powdered form is less expensive than liquid formulation; detailed permitting required before application; maximum effectiveness is compromised by low water temperatures, dense deposition and suspension of organic matter and/or sediments, fresh water seeps, and chemical breakdown by sunlight.

2. Pumping: appears expensive in comparison to powdered rotenone but is suitable in situations where chemical escapement, dilution or effectiveness are concerns; may be necessary where intended use of pond following reclamation requires reconfiguration of pond with

heavy equipment, or in conjunction with rotenone to reduce the volume of water to be treated.

3. Chlorine: not temperature sensitive in comparison to rotenone; potential for use on small ponds or in conjunction with pumping; maximum effectiveness is compromised by dense deposition and suspension of organic matter and/or sediments, fresh water seeps, and chemical breakdown by sunlight.

4. Screening: many ponds lie outside the 50 year floodplain, but may represent chronic sources of nonnative fish; screening alone may be employed to contain existing fish population in ponds outside the 50 year floodplain; similarly, inlet screens may be installed to prevent reinvasion of reclaimed ponds; screen specifications will be developed case by case; operation and maintenance of screens may be time consuming and expensive; signatures on a detailed contract outlining liabilities and responsibilities is required prior to screen installation. The contract must also identify screen ownership, parties responsible for operation/maintenance and allow access for annual inspections.

5. Water Management: requires ongoing cooperation with landowner; potential for long term control of nonnative fishes in floodplain depressions through periodic drying/filling of ponds; costs could be minimal.

6. Pond shaping: initial cost to decrease pond depth may be high but has the potential to provide long-term nonnative fish control; allows piscivorous birds better access to nonnative fish; potential for ponds to winter kill is high; increases surface acres of wetlands.

7. Reroute irrigation water: irrigation water is known to transport numerous nonnative fish species into farm ponds where they grow up and reproduce; spring-fed ponds that also receive irrigation water may have this water rerouted to prevent reinvasion of nonnative fish following reclamation.

B. Riverine monitoring

This project reappears in this SOW of work due to funding complications that precluded its initiation. An analysis of the existing **I**nteragency **S**tandardized **M**onitoring **P**rogram (ISMP) protocol for backwaters in the Grand Valley reach of the Colorado River was performed as part of this SOW from 1997 to 2000 (Bundy and Bestgen 2001). This study was performed per the directive found in the Procedures for Stocking Nonnative Fish Species in the Upper Colorado River Basin (CDOW et al. 1996) that states "the Recovery program will conduct a peer-review study to evaluate the effectiveness of the

Interagency Standardized Monitoring Program to detect changes in the survivability and/or abundance of routinely stocked fish." The draft final report is currently undergoing RIP peer-review. Findings of the 1997-2000 study indicate that the present ISMP protocol 1) detected centrarchids in only 50% of the backwaters containing them, 2) underestimated centrarchid density in 90% of the backwaters sampled, 3) accurately described true centrarchid density in only 7% of the backwaters where population estimates were made, and 4) estimated centrarchid density to be one-third of that determined from depletion or mark-recapture sampling. These findings indicate that the present ISMP protocol is inadequate for tracking key nonnative fish species in backwaters within the Grand Valley study area, and quite possibly elsewhere in the Basin. The Procedures further state that "Unless the study demonstrates that the ISMP is effective for tracking nonnative fishes, a program would have to be implemented to do so." Possible avenues of investigation given the inadequacies of the ISMP for the monitoring purposes of the Procedures include 1) identifying the species, locations and scale at which to monitor, 2) identifying the provenance of key nonnative species in backwaters to refine appropriate management actions to reduce/limit their distribution/abundance, 3) identifying the level of control needed on key species to effect changes in native fish abundance, and 4) identifying temporal aspects of backwater fish communities such as over-winter survival, interactions and influence of physical variables. A proposal will be drafted, peer-reviewed, finalized and funded as part of this Pond Reclamation Project. This investigation will be performed 2001 (pending State's contracting process) through 2004 by CSU-Larval Fish Laboratory and CDOW will serve as contract administrator and cooperator.

VII. Task Description and Schedule:

FY 2002 & 2003:

Task 1. Prioritize ponds, as they become available, by river reach and floodplain position; potential long term control of nonnative fish by chemical reclamation; feasibility of pond isolation/screening; potential for water management and pond depth manipulation; and/or inclusion of reclaimed ponds in bottom land restoration or T&E grow-out. The attached table will serve as a source of possible ponds for reclamation/screening efforts.

Task 2. Negotiate access with private landowners, and municipal and public representatives for nonnative fish control activities. Perform fish sampling; select ponds for reclamation/isolation/water management/depth manipulation in FY00/01; identify equipment, chemical, fish sampling and personnel needs; and obtain required permits.

Task 3. Negotiate access with private landowners, and municipal and public representatives for nonnative fish control activities. Perform fish removal/isolation and pond reshaping in selected ponds.

Task 4. Riverine monitoring - 1) develop a proposal for peer-review and 2) establish a sampling protocol for peer-review, incorporating modifications/suggestions for sampling goals, and evaluation/refinement by actual backwater sampling/monitoring.

Task 5. Continue the "Listening Log" for public involvement.

Task 6. Prepare and distribute news releases and secure television spots. Meet with news media as appropriate.

Task 7. Prepare article for Colorado Outdoors Magazine and Recovery Program newsletter.

VIII. FY- 2002 & 2003 Work:

- Deliverables each fiscal year:
  A. Assess 20 ponds for problematic/non-problematic status
  B. Conduct Nonnative Fish Control Efforts (reclaim, pump, isolate, decrease depth, manage water level) on 20 ponds
  C. Manage ongoing public involvement activities

- Budget

FY 2002 Costs:

A. Task 1 - Pond Evaluation	
- Labor -Utility Worker I (6 months/yr)	9,000
- Travel	1,000
- Equipment	500
- Seasonal Truck Rental (3 months)	5,000
- Total	$ 15,500
B. Task 2 - Pond Selection/Pond Sampling	
- Labor -Utility Worker I (6 months/yr)	9,000
- Travel	1,000
- Equipment	500
- Seasonal Truck Rental (3 months)	5,000
- Total	$ 15,500
C. Task 3 - Negotiate Access/Reclamation/Isolation	
- Labor - Research Associates (24 months/yr)	67,000
- Travel	5,000
- Equipment/Screens	68,000
- Other - Chemicals/Pumping/Reshaping	121,450
- Total	$261,450
D. Task 4 - Riverine monitoring	
- Labor	40,500

- Travel	3,000
- Equipment	2,500
- Other	0
- Total	$ 46,000

E. Tasks 5, 6, 7 – Public Involvement

- Labor	3,000
- Travel	2,000
- Postage (Listening Log)	1,000
- Other (materials for public meetings, etc.)	4,000
- Total	10,000

Grand Total FY 2002		$339,450
CDOW Cost Share		- 100,200
Wildlife Manager VI - Staff (10%)	7,200	
Wildlife Manager V - Biologist & Region (15%)	9,000	
Wildlife Manager III - Biologist & Region (18 mos)	63,000	
Wildlife Researcher IV (25%)	18,000	
Utility Worker I (2 mos)	3,000	
Total	$100,200	

Amount Requested from Recovery Program for FY02 $239,250

- Budget

FY 2003 Costs:

A. Task 1 - Pond Evaluation

- Labor -Utility Worker I (6 months/yr)	9,000
- Travel	1,000
- Equipment	500
- Seasonal Truck Rental (3 months)	5,000
- Total	$ 15,500

B. Task 2 - Pond Selection/Pond Sampling

- Labor -Utility Worker I (6 months/yr)	9,000
- Travel	1,000
- Equipment	500
- Seasonal Truck Rental (3 months)	5,000
- Total	$ 15,500

C. Task 3 - Negotiate Access/Reclamation/Isolation

- Labor - Research Associates (24 months/yr)	70,000
- Travel	5,000
- Equipment/Screens	68,000
- Other - Chemicals/Pumping/Reshaping	121,450
- Total	$264,450

D. Task 4 - Riverine monitoring

- Labor	48,000
- Travel	4,000
- Equipment	3,000
- Other	0
- Total	$ 55,000

E. Tasks 5, 6, 7 – Public Involvement

- Labor	3,000
- Travel	2,000
- Postage (Listening Log)	1,000
- Other (materials for public meetings, etc.)	4,000
- Total	10,000

Grand Total FY 2003		$351,450
CDOW Cost Share		- 100,200
Wildlife Manager VI - Staff (10%)	7,200	
Wildlife Manager V - Biologist & Region (15%)	9,000	
Wildlife Manager III - Biologist & Region (18 mos)	63,000	
Wildlife Researcher IV (25%)	18,000	
Utility Worker I (2 mos)	3,000	
Total	$100,200	

Amount Requested from Recovery Program for FY03 $251,250

FY-2004 Work

- Deliverables each fiscal year:
  A. Assess 20 ponds for problematic/non-problematic status
  B. Conduct Nonnative Fish Control Efforts (reclaim, pump, isolate, decrease depth, manage water level) on 20 ponds
  C. Manage ongoing public involvement activities

- Budget estimates:
  FY04 = $249,250

NOTE: FY 2000-2004:

Budget estimates based on successful public involvement program, functional landowner incentive menu, timely permitting, and agreeable pond prioritization facilitating an optimum goal for reclamation/isolation of up to 25 ponds/year.

IX. Budget Summary:

FY-2001/2002
CSU - 46,000; CDOW - $ 193,250; (CDOW cost share -$100,200) = $ 339,450
FY-2002/2003

CSU - 55,000; CDOW - $ 196,250; (CDOW cost share -$100,200) =	$ 351,450
FY-2003/2004	
CSU - 50,000; CDOW - $ 199,250; (CDOW cost share -$100,200) =	$ 349,450
Total:	$1,051,350

X. Reviewers:

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XI. References:

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